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DESCRIPTIVE CATALOGUE

OF A COLLECTION OF

ECONOMIC MINERALS

OF

NEW BRUNSWICK

PREPARED FOR THE

TORONTO EXHIBITION

ON BEHALF OF

THE NEW BRUNSWICK GOVERNMENT

BY

L. W. BAILEY, LL. D.

LATE OF THE GEOLOGICAL SURVEY OF CANADA.

1908

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Bailey, Loring Woart
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A.

I.

METALS AND THEIR ORES.

IRON

Magnetic Iron Ore.

Lepreau, Charlotte Co.

These ores occur in veins, from a quarter of an inch to eight inches in thickness, in schists of pre-Cambrian age, about two miles from the village of Lepreau. They contain 66 per cent. of metallic iron and are free from titanium. The deposits have recently been acquired by the Dominion Iron and Steel Company, of Sydney, N. S., but nothing beyond exploratory work, by boring and magnetometer, has as yet been undertaken.

Magnetic Iron Ore.

Deer Island, Charlotte Co.

The specimen exhibited is from deposits similar in age and character to those of Lepreau.

Magnetic Iron Ore.

Nepisiguit River, Gloucester Co.

The ores of this locality, though long known, have but recently attracted attention. They are found on the left bank of the Nepisiguit river, about eleven miles from the town of Bathurst and seven from the line of the Intercolonial Railway. They apparently occupy an extensive area and are of good quality, but as yet but little has been done towards their development. They are at present the property of a Montreal syndicate.

Hematite.

Jacksontown, near Woodstock, Carleton County.

What are commonly known as the Woodstock ores are found in Silurian slates, extending from Aroostook county, Maine (where they were first discovered in 1836), into Carleton county, New Brunswick, traversing the larger part of the latter. The ore beds, which vary in number, are from six inches to sixteen feet thick, and with the enclosing slates are highly inclined, giving to the beds the aspect of veins.

The first attempt to utilize the Jacksontown ores was made in 1848, after whch operations were carried on more or less interruptedly for over twenty years, the average production being 50 tons per week. The ore contains about 36 per cent. of metallic iron, with 1.29 per cent. of phosphorus and a little manganese, the latter giving it somewhat of the character of a natural spiegel. The manufactured metal was of remarkable tensile strength (24.80 tons per square inch), and was for a time used by the British Admiralty in the armor plating of vessels. The mines have, however, long since been abandoned.

COPPER

The copper ores of New Brunswick are mainly confined to a series of Pre-Cambrian rocks (chloritic and hydro-mica schists, felsites, diorites, etc.), extending along the northern side of the Bay of Fundy through the greater part of its length. The strata are highly disturbed and altered, the general conditions being very similar to those characterizing the copper bearing rocks of Sherbrooke and other points in the eastern townships of Quebec. The ores are partly chalcopyrite and partly bornite, while malachite also occurs as a secondary product.

SULPHIDE OF COPPER. (Chalcopyrite)

Letete, Charlotte County.

(Herbert McLean and Chas. E. Starr.)

Mining operations have been carried on at this point at intervals for nearly fifty years, and considerable quantities of low grade ore have been removed. The average yield from the works now in progress, attaining a depth of 375 feet, is from 2.5 per cent. to 5 per cent., but portions of the ore would yield as much as 15 per cent. The ore is chalcopyrite in white quartz, with some calcite, with a large admixture of nickeliferous pyrrhotite. The associated rocks are chloritic slates, felsites and diorites.

SULPHIDES OF COPPER. (Bornite, Chalcopyrite and Copper Glance)

Simpson's Island, Charlotte County.

The occurrence of the copper ores on Simpson's (and Adam's) Island is similar to that of Letete, except for the presence of bornite and copper glance. Some fine masses of the latter have been removed.

SULPHIDE OF COPPER. (Chalcopyrite)

Northampton—4½ miles from Woodstock, Carleton Co.

Cobbler and Sexton Mine.

This mine was discovered in 1905, since which exploratory work has been more or less continuously carried on. The ore, though of low grade (5 to 6 per cent.) is interesting as carrying small amounts of free gold, and also 3 oz. to the ton of silver.

SULPHIDES OF COPPER. (Bornite and Chalcopyrite)

Goose Creek, St. John Co. (Leonard Martin)

American Copper Co.

As in Charlotte county, the ores of eastern St. John (and Albert) county have long been known, and exploited, but, upon the whole, with unsatisfactory results. At Goose Creek the ore is mainly bornite, and large boulders of very fine ore have been found in the vicinity, but the veins so far exploited have been comparatively small. Much difficulty has also been experienced in mining operations, owing to the location of the works on a bold and dangerous coast, with but little opportunity for anchorage or wharfage.

SULPHIDE OF COPPER. (Copper Glance)

Dorchester, Westmorland County.

These ores are peculiar as occurring in gray sandstones and conglomerates of Carboniferous age, partly in the form of small veins, rarely more than a quarter of an inch in thickness, and partly disseminated through the rock in quantities not directly visible to the eye. There is also more or less of the green carbonate, and with the ore are carbonized remains of plants which have doubtless played an important part in the precipitation of the copper.

In treatment the original rock, with its contents, was directly crushed, and in the operations carried on here about 1899 was then submitted to chemical and electrolytic processes for the extraction of the copper—the plant for the purpose being of elaborate and costly construction. The result of its use was, however, found to be unsatisfactory, and the machinery, though still standing, is not now employed, other and more expeditious methods being substituted.

NICKEL

NICKELIFEROUS PYRRHOTITE.

St. Stephen, Charlotte County.

The occurrence of nickel in the vicinity of St. Stephen, N. B., was first noticed and commented on in 1871, in the reports of the Geological Survey, but did not attract popular attention until after the discovery of the valuable deposits of this metal at Sudbury, Ontario. The New Brunswick ore is, like that of Sudbury, a pyrrhotite, and occurs in or partly replaces a highly crystalline diorite, probably of Pre-Cambrian age. But while the Sudbury ore averages 3 per cent. or more of nickel, the analyses of the St. Stephen mineral rarely reached that point, most of the analyses ranging from 1.75 to 2 per cent. Some, however, reached over 4 per cent. Considerable sums of money were spent in boring and shafting, but, owing to the hardness of the rock the work was found to be very expensive, and was finally abandoned.

ANTIMONY

SULPHIDE OF ANTIMONY. (Stibnite)

Native Antimony.

Lake George, Prince William, York County.
Canadian Antimony Co. of Lake George.

The antimony ores of Lake George were first discovered in 1863 as occuring in Silurian slates, traversed by intrusive granites, about twenty-five miles north of Fredericton and about three miles from the St. John river. The ores are partly stibnite and partly native antimony, and are found in veins of white quartz over an area of about 350 acres, the veins varying from a few inches to six feet.

Active operations were soon begun by the Lake George Mining and Smelting Company on the "Hibbard property," and works were erected for smelting and reduction. When in full operation fifteen tons of metal were produced every six weeks, the charges (of 500 cwt.) affording from 45 to 55 per cent. of regulus. This was partly exported in ingots to the United States and partly employed in the manufacture of Babbit metal, the value of the regulus on the ground being 12 to 14 cents per pound, and that of the Babbit metal from 20 to 50 cents per pound. Subsequently adjoining properties were acquired and considerable quantities of ore removed by other companies, but the duties to be met, together with the then low price of the metal, as well as the destruction of the works by fire, led to a change in the disposition of the ore, this being exported in the raw state and chiefly used for the vulcanization of rubber. Still later this disposal of the ore also proved unprofitable, and for a number of years no further work was undertaken. Quite recently however, interest in these deposits has been renewed, considerable quantities of ore have been taken out and the Canadian Antimony Company of Lake George (capital $250,000) are proposing to carry on operations on an extended scale. The average percentage of antimony is 20 per cent., with in some analyses, from 1½ to 2 oz. of silver to the ton.

MANGANESE

MANGANESE OXIDES. (Manganite and Pyrolusite.)
Markhamville, Kings County.

MANGANESE OXIDES. (Manganite and Pyrolusite.)
Shepody Mountain, Albert County.
Jordan Mountain, Kings County.
Quaco (St. Martin's), St. John County.

MANGANESE OXIDES. (Manganite and Pyrolusite.)
Tattagouche River, near Bathurst.

BOG MANGANESE
Dawson Settlement, Albert County.

The manganese ores of New Brunswick are for the most part found in connection with limestones of the Lower Carboniferous system, or in superficial deposits derived from the latter. The most important deposits were those of Markhamville, Kings Co and from these, between the years 1868 and 1894, large quantities of ore were removed, the product in 1890 being 1.729 tons, valued at $34,248. The ore was, however, found in irregular pockets, leading to great uncertainty in mining operations, with corresponding irregularity and uncertainty in the yield and profits. In 1894 only 45 tons (value $2,400) were raised, and soon after work was wholly suspended.

The ores of Markhamville were remarkable for their richness the best grades ranging as high as 98 per cent. of pure ore, and worth about five cents per pound, while lower grades, shipped without special treatment, brought in England $15 per ton. The ores from the locality were almost entirely used for chemical purposes. The Markhamville mine is said to have produced some of the highest grade manganese in the world.

The manganese deposits of Shepody Mountain, Jordan Mountain, and Quaco, are similar in general character and mode of occurrence to those of Markhamville, but of lower grade. From each of the localities mentioned ore has been removed, but nothing has been done for many years.

The manganese deposits of the Tattagouche river, near Bathurst, in Gloucester county, differ from those of southern New Brunswick in being found in veins traversing Cambrian or Silurian slates. Little is known at present of their extent or value, though boulders of good ore are found scattered through the overlying superficial deposits.

At Dawson Settlement, Albert county, occurs a deposit of Wad, or Bog manganese, of remarkable extent and purity, containing by analysis about 45.81 per cent. of metallic manganese. They are therefore low grade ores as compared with those of Markhamville, but are well suited for the manufacture of spiegel and ferro-manganese, employed in steel making. For the purpose of making them better fitted for transportation and handling, works were in 1898 erected, whereby the pulverulent oxide was converted into briquettes, and considerable quantities of the latter manufactured and removed. The result of the trial was not, however, satisfactory, and at present the works are idle.

II.

NON METALLIC MINERALS.

COAL

BITUMINOUS COAL.

Minto, Queen's County, N. B.

Beersville, Kent County, N. B.

The Carboniferous rocks of New Brunswick occupy an extensive tract, equalling probably a third of its superficial area, but are apparently of no great thickness, and with comparatively little coal. The thickest bed, and as far as known the only workable one, does not exceed 3 feet; but owing to its horizontal position covers a large area, and owing to its proximity to the surface (5-30 feet) is capable of removal at a comparatively low figure. The estimated capacity of the coal areas about Newcastle, Queen's county, of which Minto forms a part, is nearly 153 million tons. For many years the output was subject to much variation, owing to want of system in removal and absence of easy access to market, but connection of Minto with Norton by rail having removed the latter difficulty, and better management having been introduced, there has of late years been a steady increase in both demand and yield.

The coal is of the caking variety, and as such is highly esteemed for blacksmiths' use. When properly screened it is also a good house coal. It is largely used upon the I. C. R. as well as for electric light works, waterworks and factories. It is worth, in Fredericton, from $3.50 to $4.00 per ton.

ALBERTITE

This interesting mineral substance, incorrectly termed "Albert coal," was probably originally a fluid petroleum, which by oxidation has hardened to its present form. It is also closely related to the latter in its properties, though differing somewhat in chemical constitution. When subjected to distillation it yields about 100 gallons of oil to the ton, while the gas product was 14,500 cubic feet of superior illuminating power. It was chiefly employed as an enricher of coal gas, and was valued at from $15.00 to $20.00 per ton.

The Albertite is found in veins in bituminous shales, of which the principal one, at the Albert mines, near Hillsboro, in Albert county, had a maximum thickness of seventeen feet. It occupied a nearly vertical fissure and was mined to a depth of over 1,100 feet, but the width in the lower workings was greatly diminished and finally became too small for profitable working. In the years 1865 and 1866 the annual shipments were 20,500 tons, which in 1869 fell off to 6,000 tons, and soon after the mines were closed.

BITUMINOUS SHALE

A considerable band of highly bituminous shales, probably of Devonian age, traverses the counties of Kings, Albert and Westmorland, and in the vicinity of Baltimore, Albert county, assumes something of the character of cannel coal. At this point operations for the utilization of the shale were undertaken in 1862, and from the so called "Black Band," when submitted to distillation, were obtained sixty-three gallons of oil to the ton; but owing to the discovery of petroleum in Pennsylvania about this time, it was found impossible to compete with the natural product, and the work was abandoned.

Quite recently renewed attention has been directed to these shales in consequence of the very successful treatment of similar shale in Scotland, and a considerable shipment from Baltimore has been sent to the latter country under the direction of the

Canadian Geological Survey, to test more thoroughly its capacity for similar treatment. The results of this experiment are not yet available in detail, but from reports so far received the prospects are very encouraging.

PETROLEUM

Memramcook, Westmorland County.

Not only are the bituminous shales of Albert county largely impregnated with oily matter, but at various points fluid petroleum has been found to occur in these and the associated rocks. Several attempts have been made by boring to increase this flow, and with some degree of success, but at present the works are idle, awaiting a larger investment of capital for their more successful development.

GRAPHITE

St. John.

Bands of impure graphite are found, associated with Laurentian limestones, at several points in the vicinity of the city of St. John, and have at different times afforded material for foundry facings and the manufacture of paint. They are not, however, at present being utilized. The material contains a little less than 50 per cent. of graphite carbon, but its state of physical aggregation is apparently unsuited for the higher uses to which graphite is often applied.

GYPSUM

Snow White Gypsum or Alabaster
Translucent Gypsum
Pink and Salmon-red Gypsum
Grey Gypsum
Crystallized Gypsum or Selenite
Fibrous Gypsum
Anhydrite

Hillsboro, Albert County.

Albert Manufacturing Company.

New Brunswick has long been noted for the extent and character of its gypsum deposits. These always occur in connection with red sediments and limestones of Lower Carboniferous age, and are found at many localities, of which Hillsboro, Albert Co., is by far the most important. The plaster beds here cover a large area and many quarries have been opened, showing faces of from thirty to one hundred feet, but without revealing the base of the deposit. The larger part of the rock is a pure white opaque gypsum of exceedingly fine grain, but with this are to be found in places all the varieties enumerated above. Anhydrite, or "hard plaster," is irregularly distributed through or with the softer gypsum, but large bodies free from such admixture are met with. Selenite or crystallized gypsum, is of rare occurrence.

The Hillsboro quarries are distant about two miles from the village of Hillsboro, the place of shipment on the right bank of the Petitcodiac river at the head of the Bay of Fundy, and at this point are extensive works for the treatment of the material brought thither by rail from the quarries. The rough rock is ground and directly shipped as land plaster, or, in the case of the finer grades, is then subjected to calcination, producing plaster of Paris. The works have been in operation since 1854, and the shipment to the United States of crude gypsum was in 1897 59,334 tons. Manufactured plaster has been shipped to the same destination during the last fifteen years at the rate of about 20,000 barrels per year, the value averaging about eighty cents per barrel. The value of crude gypsum delivered to vessels on the Petitcodiac river, ranges from 60 cents to $2.50 per ton, according to quality. About 225 hands are employed in the works and quarries.

The analysis of the Hillsboro plaster shows 98.88 of pure gypsum. Among the uses to which it is put, in addition to its employment as land plaster, fertilizer and plaster of Paris, may be mentioned the preparation of terra-alba and paper fillers, of artificial marbles, and its use in dentistry. For the latter only the very best is suitable, and the Hillsboro rock outrivals all competitors.

The United States duty on manufactured plaster is $2.25 per ton, and were it not for the superior quality of the latter, would be well nigh prohibitive.

GYPSUM.

Plaster Rock, Victoria County.

On the Tobique river, in Victoria county, are large beds of gypsum, which have for many years been used for fertilizing purposes by the farmers of Carleton county and Aroostook county, Maine. The rock is granular or fibrous, of greyish and reddish colors, but much less pure than the rock of Hillsboro, and not suitable for the higher uses to which the latter is applied.

BUILDING STONES

GREY GRANITE

Spoon Island, St. John river, Hampstead, Queens County.

RED GRANITE

St. George, Charlotte County.

BLACK GRANITE. (Mica-diorite)

Bocabec, Charlotte County.

Granite is a very abundant rock in New Brunswick, occupying large areas, and presenting several varieties. Near Spoon Island, in Hampstead, on the St. John river, the rock is the grey variety, and has been quarried for many years, being largely used for the foundations of public buildings, piers of bridges, etc. It is well situated for shipment.

Red granite is found chiefly in the vicinity of the town of St. George, in Charlotte county, and close to the line of the N. B. Southern Railway. In character and quality it much resembles the well known red granite of Aberdeen in Scotland. Works for its manufacture were first erected in 1872, advantage being taken of the power afforded by the falls of the Magaguadavic river, which flows through the village of St. George. Somewhat later several companies became engaged in the manufacture and the industry assumed large proportions, many public buildings in the United States and Canada being constructed of rock derived from this source. The output in 1893 amounted to 10,000 tons of the value of $80,000, the industry giving employment to over 100 men during eight or nine months of the year. The 40 per cnt. duty imposed by the United States government, however, greatly restricted the possible product, while the free admission into Canada of the Aberdeen rock in the form of ballast has still further tended to place the manufacture under great disadvantages.

The so-called "Black Granite"—really a mica-diorite—forms hills in the vicinity of Bocabec, Charlotte county, not far from the town of St. Andrews. It takes a good polish and is attractive in appearance, but being much harder than ordinary granite, is comparatively difficult to work and correspondingly expensive. Though well situated for removal, but little of it has as yet been used.

FREESTONES

FREESTONES

Dorchester (Budreau quarries).

GREY FREESTONE

Chatham (French-fort quarries).

RED FREESTONE

Sackville, (Sackville Freestone Co., Ltd.)

The Province of New Brunswick possesses abundant supplies of fine freestone, numerous quarries having been opened about the head of the Bay of Fundy, (as at Grindstone Island, Mary's Point, Dorchester, Sackville, etc.,) and along the North Shore, (at Chatham, Stonehaven, &c.) The color varies from grey or olive to red and purplish red, while the texture is very even, and blocks of large size are readily removed. The rock is readily dressed or carved and hardens on exposure; is mostly free of pyrite, and very durable. The superior quality is attested by the fact that the so-called "brown-stone" fronts of 5th Avenue, New York, often but incorrectly known as "Nova Scotia stone" have come from New Brunswick quarries.

ORNAMENTAL STONES

FELSPAR PORPHYRY.

Chamcook Lake, Charlotte County.

This rock forms the greater part of several hills occurring along the St. Andrews branch of the C. P. R. about five or six miles from the town of St. Andrews. It takes a fine polish and in color varies from a rich salmon red to chocolate brown, having often wavy bands of color suggesting comparison with old mahogany. It is fully equal, in beauty, when polished, to some of the porphyries used for decoration work in England and continental Europe, but no demand for such material has as yet arisen here, and it remains unutilized.

MARBLE AND SERPENTINES.

St. John, N. B.

At several points in the vicinity of St. John the old Laurentian limestones of this region are altered into marbles, exhibiting a variety of colors, such as white, pink and blue, and some of them, when polished, are handsome stones, but the rock is usually a good deal shattered, and large blocks, suitable for use, are difficult to obtain. In places the white limestone is clouded or banded with grass green serpentine, producing verde antique, and is of great beauty, but as with the other marbles, little has yet been done to test their suitability for decorative work.